# BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

## IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images, please do not report the images to the Image Problem Mailbox.**

# PATENT SPECIFICATION

*Inventor*: MARCEL PAUL MAMY

770,377

*Date of Application and filing Complete Specification April 26, 1955*

*No. 12026/55.*

*Complete Specification Published March 20, 1957.*

Index at acceptance :—**Class 78(1), A3.**

International Classification : —**B65g.**

COMPLETE SPECIFICATION

## Improvements in or relating to methods of and means for Conveying and Distributing Concrete and like Pasty Materials

We, COMPAGNIE PARISIENNE D'OUTILLAGE A AIR COMPRIMÉ, a Body Corporate organized under the Laws of France, of 11bis, rue Roquépine, Paris (8ème), France, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention is concerned with an improved method of conveying and distributing concrete and like pasty materials.

It is already known to transport and distribute materials of this type by means of vats or reservoirs equipped with a delivery pipe system in which a compressed ejection fluid such as air or another gas is circulated to carry along the pasty product by applying thereto a continuous or intermittent thrust.

The hitherto known apparatus operating according to this general principle are frequently characterized by the inconvenience of distributing the concrete or like entrained material at an irregular rate, on account of the relatively high density or compactness of the product circulating in the delivery pipes of the system.

As a result, a lack of flexibility and versatility in the transporting operations is observed, as well as the more serious risk of clogging the pipe system with plugs of concrete or like material in the constricted or narrower portions of the delivery duct, so that delays in the operation of the system cannot be avoided.

It has already been proposed to emulsify the material before the latter is ejected for fluidifying said material and facilitating thus the discharge of the container.

In a known apparatus operating according to this method, a pressure container is provided with a filling inlet in the top with fluid tight closing means to seal the same, a hopper bottom being arranged with an outlet conduit communicating with the container. A series of nozzles open into the container for admitting air from an air supply pipe through the material disposed in the hopper bottom.

The emulsified material is delivered from the hopper bottom through a discharge conduit of small diameter in which a movable plug is slidably mounted to protect said conduit from clogging in the interval of the discharging steps.

In another conveyor operating in a similar way but specially adapted to deliver powdered or granular material it has been proposed to supply the lower discharge pipe with compressed air for expelling the material in a continuous way through said pipe.

It is the essential object of this invention to provide a novel method of transporting and distributing concrete and like pasty materials of the type employing a reservoir equipped with a lower delivery duct in which a compressed ejection fluid operates, a compressed gas being introduced into the material in said reservoir to cause said material to be emulsified before being ejected, this method causing the emulsified concrete or the like to be delivered automatically without risk of clogging of the delivery duct.

This method is remarkable notably in that said reservoir communicates with said delivery duct through an enlarged elbow, said compressed gas being directed to said enlarged elbow to cause the emulsified material to be discharged automatically and intermittently in the shape of emulsified plugs.

As a result, the concrete or other pasty material to be distributed is emulsified by a stream of compressed gas and simultaneously entrained toward the discharge pipe or duct, so that emulsion and ejection steps take place practically continuously.

Of course, by properly arranging and locating the orifices through which the emulsifying pressure gas is fed to the reservoir it is pos-

[*Price 3s. 0d.*]

sible to adjust the emulsion time as well as its efficiency so that the material in the reservoir may be brought by emulsion, and as consistent with its normal density, to the desired degree of viscosity.

The present invention is also concerned with an apparatus for transporting and distributing concrete and like pasty or semi-pasty materials in accordance with the teachings of the method broadly disclosed hereinabove comprising a reservoir provided at its bottom with a delivery duct into which a pipe supplying a compressed ejection fluid opens, and one or more small orifices opening into said reservoir for supplying compressed gas into the reservoir in view of emulsifying the material therein before the latter is ejected, this apparatus being remarkable notably in that said reservoir is connected to said delivery duct by an enlarged elbow, said orifices being supplied with compressed gas through the medium of nozzles or the like disposed and directed so as to project one or more jets of compressed gas toward said enlarged elbow.

According to another feature of the present invention the reservoir comprises a priming hopper through which it is connected to a lower ejection duct the axis of which is substantially at right angles to the axis of the reservoir, closing means being provided for causing said reservoir to get fluid tight and receive a compressed gas pressuring the inner space of said reservoir.

Where a plurality of inlet orifices are provided for the fluid to be used for emulsifying the material, the orientation and output of these orifices may be regulated with a view to create in the mass of material a strong stirring action promoting the homogenization of the emulsified material.

Other features and advantages of the present invention will appear as the following description proceeds with reference to the accompanying drawing showing diagrammatically by way of example a practical form of an apparatus embodying the method of the present invention. In the drawing:—

Figure 1 is an elevation sectional view of the apparatus, and

Figure 2 is a horizontal section taken upon the line II—II of Figure 1.

In the example illustrated in the drawing the transporting and distributing apparatus comprises a reservoir or vat 1 having a substantially vertical axis, provided with an upper aperture 2 through which the materials to be distributed are introduced into the reservoir, and a funnel-shaped closing valve illustrated diagrammatically at 3. This valve 3 may bear against a seat-forming tapered wall 4 constituting the edge of the aperture 2 and having a lining 5 of a material adapted to ensure a fluid-tight closing of the aperture 2.

The upper portion of the reservoir 1 has connected thereto a pipe 6 for supplying a pressure fluid intended to exert a thrust on the free surface of the concrete or other material contained in the reservoir.

The lower, substantially tapered portion 7 of this reservoir is connected to another, widened portion 8 positioned below the portion 7 and constituting an expansion chamber adapted to be supplied with compressed air or another pressure gas through orifices 9, 9', 9'' opening into this chamber and supplying this chamber. Preferably, these orifices are formed in an annular member 10 constituting a kind of collar surrounding the reservoir 1 substantially at the level of the aforesaid widened portion 8; besides, these orifices are disposed at spaced angular intervals and in circular fashion on the same side of the reservoir 1 with respect to a plane passing through the axis 11 of the reservoir.

Also preferably, these orifices 9, 9' and 9'' are in the form of nozzles having a slightly tapered longitudinal section with the smaller cross-sectional area positioned at the inner end of the orifices, the axis 12 of each nozzle being inclined toward the central portion of the elbow 13 connecting the tapered portion 7 of the reservoir to the delivery duct 14 at the lower end of the apparatus.

A pipe 15 adapted to be supplied with ejection fluid opens into the lowermost portion of the elbow 13 and has its axis substantially parallel to the axis of the delivery duct 14, as shown. This pipe 15 is positioned on the same side, with respect to the axial vertical plane 16 of the apparatus (Fig. 2) as the orifices 9, 9', 9''. On the other hand, the outer wall 17 of the elbow 13 is relatively steep in the direction of flow of the material delivered from the reservoir, so that the duct 15 leading into the region 19 through this wall 17 will be connected therewith in a relatively wide area 18.

The orifices 9, 9', 9'' are preferably positioned so as to direct the jets of compressed gas issuing therefrom toward the chamber 19 at the bottom of the elbow 13, this chamber 19 registering with the connecting area 18, as shown.

The operation of the apparatus described hereinabove is as follows:—

The material is introduced into the reservoir 1 through the upper aperture 2. Then the valve 3 is closed and a pressure built up within the reservoir 1 by supplying compressed air or another gas through the upper pipe 6; at the same time the orifices 9, 9' and 9'', and the pipe 15 deliver a compressed fluid into the reservoir 1. Thus, the material engaged in the elbow 13 is emulsified and strongly stirred by the jets of fluid delivered through the orifices 9, 9' and 9'', besides the mass of material thus emulsified is thrust by this fluid into the chamber 19, i.e., in front of the region 18 where the compressed-air duct 15 is connected to the elbow 13, and as a consequence the

emulsified material is projected with force into the delivery duct 14.

Preferably, the shape of the elbow 13 and of the delivery duct 14 is such that a plurality of plugs of emulsified material will be formed successively in the chamber 19, these plugs being discharged automatically and intermittently as they are formed.

From the foregoing it will be readily understood that the delivery of emulsified material in the form of successive plugs as described takes place very regularly due to the increased fluidity of the material delivered by the apparatus. In fact, practical experience shows that the distribution of compact concrete, for example, which normally causes the formation of plugs clogging at regular intervals the delivery duct, is replaced, when an apparatus according to this invention is employed by a quicker distribution of concrete in the form of fluid emulsified blocks delivered at a faster and more regular rate through the delivery duct 14, without any risk of clogging the latter in a protracted manner.

Of course, the orifices 9, $9^1$, $9^{11}$ may have any desired and suitable shape, cross-sectional contour and arrangement. Their number may also vary, and separate or common supply pipes may be connected thereto for supplying compressed fluid therethrough. Besides, these orifices may be positioned at different levels in the reservoir of the apparatus.

Valves or like means may be provided for adjusting separately or simultaneously the rate of fluid flow through the orifices 9, $9^1$ and $9^{11}$ so as to promote the inner stirring of the material located within the elbow 13 in view of ensuring a perfect homogenization of the emulsified mass of material.

Similarly, any automatic or non-automatic regulation system may be mounted on the pipes connected to the inlets 6 and 15 in order to synchronize the steps of feeding emulsifying and ejecting the material contained in the reservoir during the operation of the apparatus.

The reservoir 1 provided in the embodiment shown may also have a different shape or different constructional features than those illustrated.

Of course, the invention should not be construed as being limited to the form of embodiment shown and illustrated herein, as many modifications may be brought thereto without departing from the scope of the invention as disclosed in the appended claims.

What we claim is:—

1. An improved method of transporting and distributing concrete or other similar pasty materials of the type employing a reservoir equipped with a lower delivery duct in which a compressed ejection fluid operates, a compressed gas being introduced into the material in said reservoir to cause said material to be emulsified before being ejected characterized in that said reservoir communicates with said delivery duct through an enlarged elbow, said compressed gas being directed to said enlarged elbow to cause the emulsified material to be discharged automatically and intermittently in the shape of emulsified plugs.

2. An apparatus for transporting and distributing concrete or other similar pasty materials by the method as claimed in the Claim 1 comprising a reservoir provided at its bottom with a delivery duct into which a pipe supplying a compressed ejection fluid opens, and one or more small orifices opening into said reservoir for supplying compressed gas into the reservoir in view of emulsifying the material therein before the latter is ejected characterized in that said reservoir is connected to said delivery duct by an enlarged elbow said orifices being supplied with compressed gas through the medium of nozzles or the like disposed and directed so as to project one or more jets of compressed gas toward said enlarged elbow.

3. An apparatus according to Claim 2 characterized in that the reservoir comprises a priming hopper through which it is connected to a lower ejection duct the axis of which is substantially at right angles to the axis of the reservoir closing means being provided for causing said reservoir to get fluid tight and receive a compressed gas pressuring the inner space of said reservoir.

4. An apparatus according to either of the Claims 2 or 3 characterized in that the reservoir is provided with one or a plurality of ducts leading into the upper portion thereof and adapted to supply a compressed gas above the free surface of the material.

5. An apparatus according to any of the Claims 2 to 4 characterized in that the said orifice or orifices are disposed substantially in a common plane along a circular arc disposed on the side opposite to said ejection duct with respect to the axis of the reservoir.

6. An apparatus according to any of the Claims 2 to 5 characterized in that the reservoir in the region thereof where the said orifices or nozzles are located, has a portion of greater cross-sectional area which creates a local expansion chamber.

7. A method substantially as described hereinabove and illustrated in the accompanying drawing.

8. An apparatus substantially as described hereinabove and illustrated in the accompanying drawing.

MEWBURN, ELLIS & CO.,
70/72, Chancery Lane, London, W.C.2,
Chartered Patent Agents.

Leamington Spa: Printed for Her Majesty's Stationery Office, by the Courier Press.—1957.
Published at the Patent Office, 25, Southampton Buildings, London, W.C.2, from which copies may be obtained.

770,377 COMPLETE SPECIFICATION
1 SHEET

This drawing is a reproduction of the Original on a reduced scale.

FIG. 1

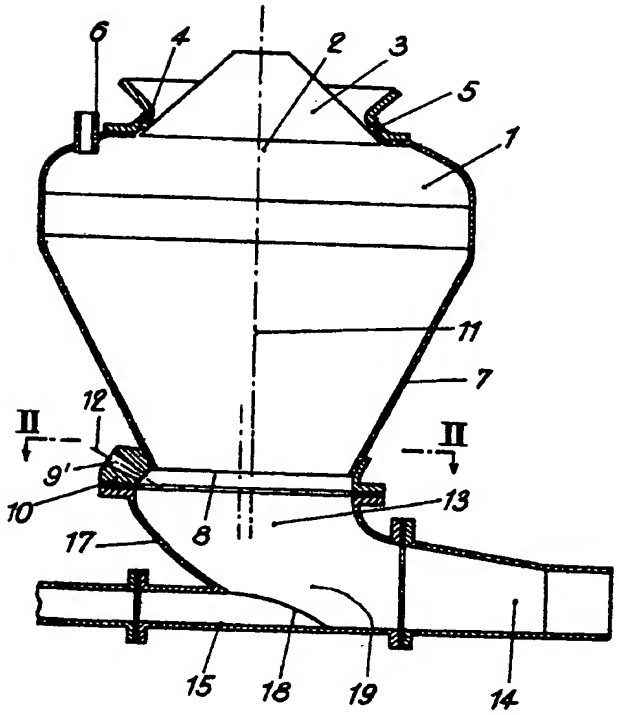


FIG. 2